

# A review of the genus *Pseudohedya* Falkovitch from China , with description of two new species ( Lepidoptera : Tortricidae : Olethreutinae )

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**Abstract :** The genus *Pseudohedya* is reviewed from China. Two new species , *i. e.* , *Pseudohedya fanjingica* sp. nov. from Mt. Fanjing , Guizhou Province and *P. liui* sp. nov. from Mt. Wangwu , Henan Province , China , are described. One species , *Pseudohedya retracta* Falkovitch , is recorded for the first time from this country. The diagnostic characters of the two previously known species in China , *P. gradana* Christoph and *P. cincta* Falkovitch , are discussed. The genus previously known only in the Palearctic region is recorded for the first time from the Oriental Region ( Guangdong , Guizhou , Sichuan and Hubei , China ). A key to all the known species of the genus is given based on the male genitalia. Photos of adults and genitalia are provided.

**Key words :** Lepidoptera ; Tortricidae ; Olethreutinae ; *Pseudohedya* ; new species ; China

*Pseudohedya* Falkovitch is a small genus in Olethreutini , with only five species known in Palearctic eastern Asia : *P. gradana* ( Christoph ) , *P. cincta* Falkovitch , *P. retracta* Falkovitch , *P. satoi* Kawabe and *P. plumbosana* ( Kawabe ). Two species , *viz.* *P. gradana* and *P. cincta* , were previously recorded from Mt. Changbai , Jilin Province , China by Bae *et al.* ( 2000 ). During our research on Olethreutini , we found the genus for the first time from the Oriental Region with the species from southern China. In this paper , five species of the genus from China are treated , including two new species and one new record species for China.

The wing patterns follow the system by Brown and Powell ( 1991 ) , refined in Baixeras ( 2002 ). Terminology of the genitalia follows Heinrich ( 1926 ). Genitalia dissections follow Li and Zheng ( 1996 ). The type specimens and other specimens studied are deposited in the Insect Collections , College of Life Sciences , Nankai University , Tianjin , China.

## *Pseudohedya* Falkovitch , 1962

*Pseudohedya* Falkovitch , 1962a : 192 , figs. 3–4.

Type species : *Grapholitha gradana* Christoph , by original designation.

Generic characters : Forewing fuscous suffused with yellow , striae from costal strigulae distinct , postmedian and preterminal fasciae carrying short dark lines ;  $R_5$  ,  $M_1$  ,  $M_2$  and  $M_3$  parallel ,  $CuA_1$  branching off from lower angle of cell , close to  $M_3$  at base , trace

of M stem reaching mid distance between  $M_2$  and  $M_3$  , chorda extending from mid distance between  $R_1$  and  $R_2$  to base of  $R_5$  . In hind wing ,  $M_3$  and  $CuA_1$  stalked very shortly or connate ,  $M_2$  approximated at base ,  $M_1$  and  $R_5$  closely approximated towards base , dorsum without roll. Posterior tibia without hair pencils.

Male genitalia : Uncus slender or absent. Socius oval , rounded or parietal , densely hairy. Gnathos narrow or broad. Tuba analis with a well-developed and often sclerotized subscaphium. Valva slender , often curved ; sacculus simple and with indistinct angle , or complicated ( in the type species and *P. plumbosana* ) ; cucullus densely spined. Aedeagus short or moderate in length , without cornuti.

Female genitalia : Sterigma diverse in shape , a simple sclerite with ostium set anteriorly or opened on caudal top. Colliculum slender , moderate in length or very long. Ductus bursae membranous , moderate or very long. Corpus bursae oval or elongate oval ; signa consisting of two unequal horns or a small concaved plate.

Remarks : Diakonoff ( 1973 ) divided the tribe Olethreutini Obraztsov into twelve subtribes , and placed *Pseudohedya* in the subtribe Neopotamiae based on the large and robust signa in the type species. However , he stated that *Pseudohedya* was close to *Semniotes* Diakonoff , a member of the subtribe Statherotides , by sharing the well-developed subscaphium and henion.

基金项目 : 国家基础科学人才培养基金特殊学科点项目

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收稿日期 Received : 2005-12-06 ; 接受日期 Accepted : 2006-05-16

Falkovitch ( 1962a ) presumed *Pseudohedya* was close to Hedya Hübner , which was later placed into the subtribe Olethreutae by Diakonoff ( 1973 ). Razowski ( 1989 ) proposed that the autapomorphy of the genus was the vestiture at the basal area of the valva , and that the apical sclerite of the sacculus in the type species ( in fact it is the free apex of sacculus ) was of convergent importance. Accordingly , he suggested that this genus should be allied to *Statherotmantis* Diakonoff belonging to the subtribe Statherotides. But as far as the female genitalia is concerned , it is obvious that *Pseudohedya* is not close to the members of the subtribe Statherotides

that is characterized by two large pectinate signa. As the signa in *Pseudohedya* are horned or small concaved plate , the genus is more likely to be allied to the subtribe Olethreutae or be a member of it. Further study is needed to determine its final systematic status.

Biology : *Elaeagnus* sp. ( Elaeagnaceae ) was recorded to be the food plant of *Pseudohedya gradana* ( Christoph ) in Japan ( Kawabe , 1982 ). For the rest species of the genus , their biology is unknown.

Distribution : China , Korea , Japan , Russia ( Far East ).

#### Key to the species of *Pseudohedya* based on the male genitalia

1. Uncus absent ..... 2  
Uncus small , slender or moderate ..... 3
2. Sacculus 1/3 length of valva , broad , with dense and uniform thorns ; cucullus slender , gradually broadened to apex ; aedeagus very short ..... *P. gradana* ( Christoph )  
Sacculus half length of valva , narrow , almost naked except for sparse spines along ventral edge of cavity ; cucullus broad , gradually narrowed to apex ; aedeagus moderate in length ..... *P. luii* sp. nov.
3. Socius narrow ; tuba analis with subscaphium expanded apically ; cucullus with a prominent and free base ..... *P. cincta* Falkovitch  
Socius oval or rounded ; tuba analis with subscaphium not expanded apically ; cucullus with base not prominent ..... 4
4. Tuba analis with subscaphium triangular , ending in a pointed angle with small dentations ..... *P. retracta* Falkovitch  
Tuba analis with subscaphium narrow , apex narrow but not pointed and without small dentations ..... 5
5. Uncus bilobed apically ; valva with sacculus abruptly narrowed and curved beyond 1/2 length , Spc1 consisting of a small and stiff sheaf of bristles ..... *P. plumosana* ( Kawabe )  
Uncus not bilobed apically ; valva with sacculus straight throughout , Spc1 consisting of a row of spines or absent ..... 6
6. Uncus with two short lateral projections apically , bearing hairs underneath it ; valva curved at 1/3 and 2/3 respectively , Spc1 consisting of a row of spines along upper edge of sacculus , distally intermixed with spines of cucullus ..... *P. satoi* Kawabe  
Uncus lacking above-mentioned projections , densely hairy at apex ; valva curved at 2/5 and 4/5 respectively , Spc1 absent , sacculus almost naked in distal part ..... *P. fanjingica* sp. nov.

#### *Pseudohedya cincta* Falkovitch , 1962 ( Figs. 1 , 6 )

*Pseudohedya cincta* Falkovitch , 1962b : 357 , fig. 5 ( Russia : Primorsky ).

*Pseudohedya elaborata* Kawabe , 1976 : 45 , figs. 8 , 21 , 27.

Materials examined. China : 1 ♂ , Mt. Changbai ( 42°02' N , 128°08' E ) , Jilin Province , 760 m , 1-VIII-2004 , leg. ZHANG Ai-Huan.

Adult ( Fig. 1 ) : Forewing length 9.0 mm in male.

Male genitalia ( Fig. 6 ) : As illustrated.

Distribution : China ( Jilin ) ; Korea ( Park , 1983 ) ; Japan ( Diakonoff , 1973 ) ; Russia.

Remarks : This species is characterized by the robust and strongly sclerotized gnathos and the apically expanded subscaphium in the male genitalia. Kawabe ( 1984 ) synonymized *Pseudohedya elaborata* with this species. Bae *et al.* ( 2000 ) recorded it from Mt. Changbai , China.

#### *Pseudohedya gradana* ( Christoph , 1881 ) ( Figs. 2 , 7 )

*Grapholitha gradana* Christoph , 1881 : 419 ( Russia : Amur ).

*Laspeyresia gradana* : Walsingham , 1900 : 432.

*Enarmonia gradana* : Inoue , 1954 : 93.

*Pseudohedya gradana* : Falkovitch , 1962a : 192 , figs. 3-4.

Materials examined : China : 1 ♂ , Lianzhou ( 24°48' N , 112°23' E ) , Guangdong Province , 650 m , 25-VI-2004 , leg. ZHANG Dan-Dan.

Adult ( Fig. 2 ) : Forewing length 9.5 mm in male.

Male genitalia ( Fig. 7 ) : As illustrated.

Distribution : China ( Jilin , Guangdong ) ; Korea ( Park , 1983 ) ; Japan ( Inoue , 1954 ) , Russia.

Remarks : This species is distinguishable by sacculus bluntly right-angled , with very dense and converging thorns and a free apex in the male genitalia. Bae *et al.* ( 2000 ) recorded it from Mt. Changbai , China. In this study it was found from the Oriental Region for the first time.

#### *Pseudohedya retracta* Falkovitch , 1962 ( Figs. 3 , 8 , 11 ) New Record for China

*Pseudohedya retracta* Falkovitch , 1962b : 355 , figs. 3-4 ( Russia : Primorsky ).

Materials examined : China : 1 ♂ , Mt. Wangwu ( 35°16' N , 112°10' E ) , Henan Province , 700 m , 3-VI-2000 , leg. YU Hai-Li ; 2 ♂♂ , same data except 4-VI-2000. 2 ♂♂ , 2 ♀♀ , Hui County ( 35°27' N , 113°47' E ) , Henan Province , 780 m , 12-VII-2002 , leg. WANG Xin-Pu ; 2 ♂♂ , 2 ♀♀ , same data except 13-VII-2002. 1 ♂ , Huangshi 'an ( 33°40' N , 111°37' E ) , Henan Province , 890 m , 16-VII-1998 , leg. LI Hou-Hun ; 1 ♂ , same data except 19-VII-1998. 1 ♂ , Neixiang ( 33°02' N , 111°50' E ) , Henan Province , 1 350 m , 13-VII-1998 , leg. LI Hou-Hun. 2 ♂♂ , Neixiang ( 33°02' N , 111°50' E ) , Henan Province , 650 m , 12-VII-1998 , leg. LI Hou-Hun. 1 ♂ , Ji County ( 40°02' N , 117°24' E ) , Tianjin , 300 m , 11-VI-2004 , leg. LI Hou-Hun. 1 ♂ , Ji County

( $40^{\circ}02' N$ ,  $117^{\circ}24' E$ ), Tianjin, 560 m, 16-VII-2005, leg. LI Hou-Hun. 1 ♂, Wufeng County ( $30^{\circ}02' N$ ,  $116^{\circ}40' E$ ), Hubei Province, 1 000 m, 10-VII-1999, leg. LI Hou-Hun. 1 ♂, Lianzhou ( $24^{\circ}48' N$ ,  $112^{\circ}23' E$ ), Guangdong Province, 650 m, 25-VI-2004, leg. ZHANG Dan-Dan. 1 ♂, Chengcheng ( $35^{\circ}11' N$ ,  $109^{\circ}56' E$ ), Shaanxi Province, 1 000 m, 30-VII-1986, leg. LI Hou-Hun; 1 ♂, same data except 31-VII-1986. 1 ♀, Wolong ( $30^{\circ}59' N$ ,  $103^{\circ}08' E$ ), Sichuan Province, 2 008 m, 26-VII-2005, leg. YU Hai-Li. 1 ♀, Wen County ( $32^{\circ}58' N$ ,  $104^{\circ}41' E$ ), Gansu Province, 860 m, 10-VII-2005, leg. YU Hai-Li.

Adult (Fig. 3): Forewing length 8.0–10.0 mm in male, 8.5–9.0 mm in female.

Male genitalia (Fig. 8): As illustrated.

Female genitalia (Fig. 11): As illustrated.

Distribution: China (Tianjin, Henan, Hubei, Guangdong, Sichuan, Gansu); Korea (Park and Kawabe, 1986); Japan (Kawabe, 1982); Russia.

Remarks: This species resembles *Hedya subretracta* (Kawabe) in appearance and the male genitalia, but can be separated from it by the rougher and darker markings in the forewing, the longer and apically narrowed valva and the well-developed subscaphium in the male genitalia; while the latter species has bright golden yellow markings in appearance, a distally expanded valva and a weakly developed and membranous tuba analis in the male genitalia. This species was found from the Oriental Region for the first time in this study.



1



2



3



4



5

Figs. 1–5 Adults of *Pseudohedya* spp.

1. *P. cincta* Falkovitch, ♂; 2. *P. gradana* (Christoph), ♂; 3. *P. retracta* Falkovitch, ♂; 4. *P. liui* sp. n., ♂, paratype; 5. *P. fanjingica* sp. n., ♂, paratype.

### *Pseudohedya liui* sp. nov. (Figs. 4, 9, 12)

Holotype: China: ♂, Mt. Wangwu ( $35^{\circ}16' N$ ,  $112^{\circ}10' E$ ), Henan Province, 700 m, 3-VI-2000, leg. YU Hai-Li; slide number YHL04892. Paratypes: 3 ♂♂, 1 ♀, same data as holotype; 1 ♂, 4-VI-2000, other data same as holotype; 4 ♂♂, 5-VI-

2000, other data same as holotype.

Diagnosis: This species resembles *Pseudohedya cincta* in appearance, but can be separated from it by the relatively narrow forewing and the leaden striae from costal strigulae. In the latter species, forewing is a little broader, strongly curved at costa, and costal

strigulae have white or pale grey striae. The new species can be further distinguished from the latter species by the male genitalia lacking uncus , with socius oval and subscaphium relatively less developed , evenly broad , not expanded apically. In *P. cincta* , uncus is slender , socius narrow and subscaphium strongly sclerotized and expanded apically.

Description : Adult ( Fig. 4 ) : Head roughly scaled , fuscous dusted with yellow. Antenna fuscous. Labial palpus ascending , with short and compact scales , white except the apex of median segment and the terminal segment pale grey ; terminal segment obtuse. Thorax fuscous , dusted with yellow and yellowish fuscous ; posterior crest distinct , fuscous. Legs pale yellow ; tarsus with pale fuscous or fuscous rings ; median tibia with thorn-like scales and a fuscous apical blotch at outer side ; posterior tibia slightly broadened. Abdomen pale fuscous dorsally , pale yellow ventrally.

Forewing length 8.5 – 10.0 mm in male , 10.0 mm in female. Upper side pale fuscous , fascia fuscous with golden yellow pigmentation. Costa with nine pairs of white strigulae from base to  $R_4$  , striae from them distinct , leaden and with white margins ; strigulae one and two at base , extending to the base of  $1A + 2A$  , striae from them extending to dorsum before  $1/4$  length of it ; strigulae from strigulae three and four confluent above  $2/3$  length of the lower edge of cell , broad and distinct , separated between cell and middle of  $1A + 2A$  , reaching  $1/3$  length of dorsum ; stria from strigula five prominent , broken at  $1/5$  length of  $R_4$  , broad between  $R_5$  and  $M_3$  , separated below  $M_3$  and reaching  $2/3$  length of dorsum ; stria from strigula six broken , appearing as a distinct short blotch between  $M_1$  and  $CuA_1$  and a small dot below  $3/4$  length of  $CuA_1$  ; stria from strigula seven narrow , terminally becoming paler , and disappeared at  $5/6$  length of  $R_5$  ; strigulae from strigulae eight and nine indistinguishable ; strigula ten



Figs. 6 – 10 Male genitalia of *Pseudohedya* spp.

6. *P. cincta* Falkovitch ( slide no. YHL04391 ) ; 7. *P. gradana* ( Christoph ) ( slide no. YHL04458 ) ;  
8. *P. retracta* Falkovitch ( slide no. YHL04457 ) ; 9. *P. liui* sp. n. ( slide no. YHL04892 ) , holotype ;  
10. *P. fanjingica* sp. n. ( slide no. YHL04898 ) , holotype.

on termen between apex and  $R_5$ , distinct; subbasal fascia obliquely rectangular above CuP, becoming a narrow band below; median fascia narrow on costa, broken at end of cell and dividing into two blotches with white margins, the upper one triangular, the distal edge protruding to  $1/5$  length of  $R_4$ , the lower one elongate, upper angle reaching  $1/4$  length of  $M_1$ , lower edge a little broad, reaching median part of dorsum; postmedian fascia and preterminal fascia confluent between distal  $3/4$  length of  $R_5$  and tornus, surrounding the broken part of stria from strigula six, with short dark fuscous lines, proximal edge concave; terminal fascia a short line; cilia white at apex, fuscous dusted with yellow on termen and tornus, with a blackish fuscous baseline; underside yellowish fuscous, except the distal seven pairs of strigulae yellow and the area of hindwing overlapping pale yellow. Hindwing upper side fuscous, basal half paler, the area of forewing overlapping pale yellow; cilia pale yellow, with yellow baseline above 1A and fuscous baseline below; underside concolorous with forewing underside except cell white.

Male genitalia (Fig. 9): Uncus absent. Socius parietal, oval, with dense hairs. Tuba analis with subscaphium evenly broad. Valva broad; sacculus half length of valva, distal part naked, without spine clusters; cucullus broad, slightly narrowed to apex, densely spined. Aedeagus simple, moderate in length.

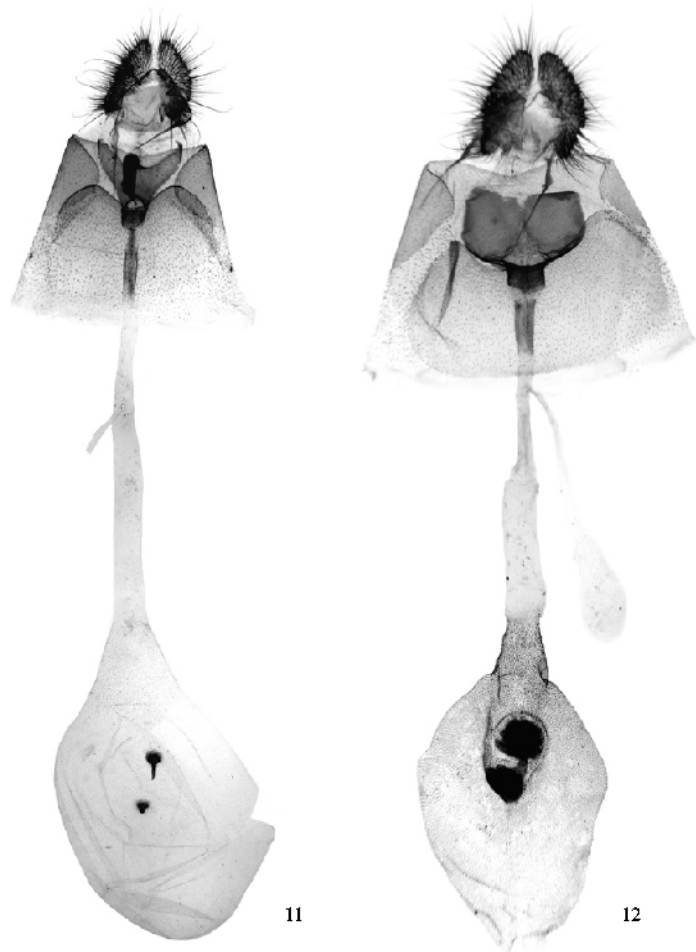
Female genitalia (Fig. 12): Sterigma a large plate, somewhat rectangular, divided into three areas, two lateral and caudal areas rounded and naked, and a small median area triangular and aciculate. Ostium with a short and aciculate antrum. Colliculum long and straight, anterior part less developed. Ductus bursae membranous, anterior  $1/4$  portion granulated; corpus bursae oval, granulated; signa two robust horns, each with a basal plate.

Distribution: China (Henan).

Etymology: The specific name is dedicated to Prof. LIU You-Qiao for his extensive work on Tortricidae of China.

***Pseudohedya fanjingica* sp. nov. (Figs. 5, 10)**

Holotype: China: ♂, Mt. Fanjing ( $27^{\circ}55' N$ ,  $108^{\circ}41' E$ ), Guizhou Province, 2 200 m, 30-V-



Figs. 11 – 12 Female genitalia of *Pseudohedya* spp.

11. *P. retracta* Falkovitch (slide no. YHL04912); 12. *P. liui* sp. n. (slide no. YHL04893).

2002 , leg. WANG Xin-Pu ; slide number YHL04898. Paratypes : 2 ♂♂ , 1 390 m , 29- V -2002 , other data same as holotype.

Diagnosis : This species is very similar to *Pseudohedya satoi* both in appearance and in the male genitalia , but can be separated from it by the uncus lacking apical projections , the valva curved at 2/5 and 4/5 respectively , sacculus naked in distal part , without Spc1. In *P. satoi* , the uncus carries two short lateral projections apically , the valva is curved at 1/3 and 2/3 lengths respectively , Spc1 is composed of a row of spines along upper edge of sacculus and distally intermixed with spines of cucullus.

Description : Adult ( Fig. 5 ) : Head roughly scaled , yellow , with a tuft of fuscous scales behind antenna. Antenna fuscous. Labial palpus ascending , yellow ; median segment slightly broadened from base to apex , apex and the obtuse terminal segment fuscous with blue shinning. Thorax fuscous , densely and evenly sprinkled with very small yellow dots formed by yellow tips of fuscous scales. Legs yellow ; anterior and median tarsi with black rings ; median tibia with thorn-like scales ; posterior tibia broadened.

Forewing length 8.5 – 9.5 mm in male. Upper side fuscous , densely and evenly sprinkled with very small yellow dots ; fascia absent ; costa with nine even pairs of yellow strigulae , striae from proximal five pairs indistinct ; striae from strigulae five and six extending obliquely to tornus ; striae from strigulae seven , eight and nine confluent , reaching M<sub>1</sub> on termen ; eight short dark fuscous lines on postmedian fascia ; cilia yellow , with dark fuscous baseline between apex and CuA<sub>1</sub> ; underside yellowish fuscous , except the distal seven pairs of strigulae yellow and the area of hindwing overlapping pale fuscous. Hindwing upper side fuscous , basal half slightly paler , the area of forewing overlapping white ; cilia pale yellow , tinged with fuscous ; underside concolorous with forewing underside , cell paler.

Male genitalia ( Fig. 10 ) : Uncus long , hooked , densely with hairs beneath apex. Socius rounded , with dense hairs. Tuba analis with narrow and straight subsclaphium. Henion broad. Valva long , curved at 2/5 and 4/5 respectively ; sacculus straight , distal portion naked , without Spc1 ; cucullus densely hairy , with median part slightly narrowed. Aedeagus simple , narrow.

Female genitalia : Unknown.

Distribution : China ( Guizhou ).

Etymology : The specific name is from the type locality , Mt. Fanjing , Guizhou Province.

**Acknowledgments** We wish to express our thanks to Prof. SHEN Xiao-Cheng , Henan Academy of Agricultural Science ; Prof. WEI Mei-Cai , Central South Forestry University ; Mr. WANG Hong-Jian , Head of Baishuijiang Nature Reserves ; Prof. LI Zi-Zhong , Guizhou University , China for their assistance in our field collecting trips.

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( 责任编辑 : 袁德成 )

# 中国发小卷蛾属研究及二新种记述 (鳞翅目:卷蛾科:新小卷蛾亚科)

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**摘要:**发小卷蛾属 *Pseudohedya* Falkovitch 全世界已知 5 种,分布在古北区东部(日本、韩国、俄罗斯远东地区及我国长白山)。本研究中首次在东洋区发现该属。本文报道了中国所有种类,其中记述 2 新种:梵净发小卷蛾 *P. fanjingica* sp. nov.(贵州梵净山)与刘氏发小卷蛾 *P. liui* sp. nov.(河南王屋山);缩发小卷蛾 *P. retracta* Falkovitch 为中国新纪录种(河南、陕西、天津、湖北、广东、四川、甘肃)。文中提供了分种检索表、形态特征图、雄性外生殖器图及部分种的雌性外生殖器特征图。模式标本保存在南开大学昆虫标本室。

**关键词:**鳞翅目;卷蛾科;新小卷蛾亚科;发小卷蛾属;新种;中国

**中图分类号:**Q969 **文献标识码:**A **文章编号:**0454-6296(2006)04-0664-07

## 新种简述

刘氏发小卷蛾 *Pseudohedya liui* sp. nov.

前翅 8.5 – 10.0 mm。

正模:♂,河南济源王屋山(35°16'N, 112°10'E),海拔 700 m, 3-VI-2000,于海丽采,玻片号 YHL04892。副模:3 ♂♂, 1 ♀,采集资料同正模;1 ♂, 4-VI-2000,其余资料同正模;4 ♂♂, 5-VI-2000,其余资料同正模。

本新种外部形态与卷发小卷蛾 *P. cincinna* Falkovitch 相似,但是前翅略窄,钩状纹下方的纵纹铅色。后者前翅稍宽,前缘凸出,钩状纹下方的纵纹白色或浅灰色。雄性外生殖器特征二者易于区分:本新种无爪形突,尾突圆片状,下匙形突骨化弱;而卷发小卷蛾中,爪形突细长,尾突极窄,下匙形突粗壮、骨化强烈、末端膨大。

梵净发小卷蛾 *Pseudohedya fanjingica* sp. nov.

雄虫前翅 8.5 – 9.5 mm。

正模:♂,贵州梵净山(27°55'N, 108°41'E)金顶,海拔 2 200 m, 30-V-2002,王新谱采,玻片号 YHL04898。副模:2 ♂♂,贵州梵净山护国寺,海拔 1 390 m, 29-V-2002,王新谱采。

本新种同分布于日本的 *P. satoi* Kawabe 相似,但可以通过下列特征区别:雄性外生殖器中爪形突末端两侧无突起,抱器瓣分别在 2/5 与 4/5 处弯曲,抱器腹端部光裸,无第一刺丛。后者雄性外生殖器中爪形突末端两侧各有一个小突起,其下方被毛,抱器瓣分别在 1/3 与 2/3 处弯曲,具第一刺丛。